

## ABSTRACT OF THE DISCLOSURE

Multi-Axes Tool Compensation expands the tool compensation methods available to the CNC machine operator from the 2D world to 3D and 5 axis directly inside the CNC Controller without involving the CNC programmer to re-define tool locations and offsets defined in the G code program. The CNC machine operator can insert and override any of the cutting methods or scenarios originally pre-defined in the G code program to add 3D and 5-axis tool offsets and tool shape characteristics. These algorithms also provide for automatic tool gouge avoidance protection. Tools are also re-located to safe positions when necessary. Multi-Axes Tool Compensation technology provides for 3D and 5-axis tool definitions and tools offsets accessible to the CNC machine operator.